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(54) **Reports having identification data and printing thereof**

(57) A bill form indicates its number by bar code and magnetic ink characters. When reading a utility meter, a meter reader uses a bar code reader 26 to enter the number of the next form into a portable computer 24 and calls up customer data (loaded into the portable computer from a main computer 30) and enters the meter reading. The portable computer prints 22 the bill on the form. The customer 32 takes the form to a bank 34 to pay. The bank sends part of the form to the utility company where the magnetic ink characters are read 36 to give the form number which is correlated in the main computer 30 with the form numbers provided in association with customer identifications by the portable computer, to identify the customer and credit his account.

A keyboard may be used instead of the bar code reader, or a bill printer counter. Optical characters are also mentioned.
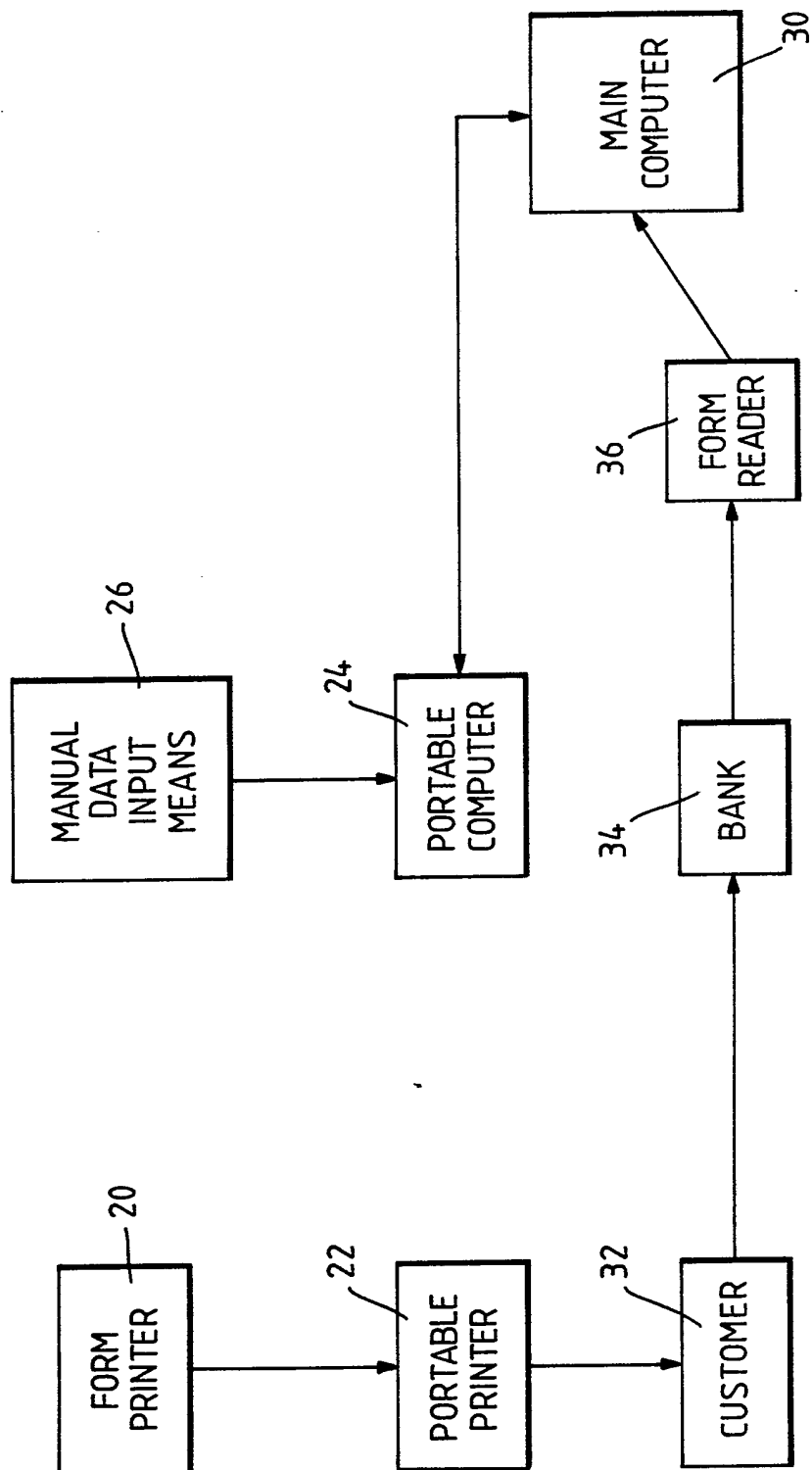
Fig.2.

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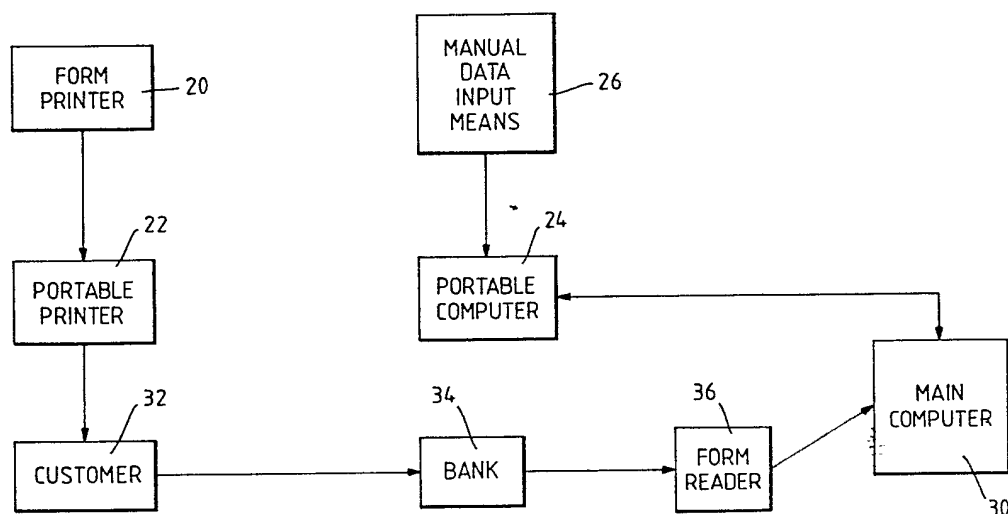
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1982.

Fig.1.

חשבון

קוד

(ניזנר ויהוי פיי)

נחיבום עד		חקיבח	יוקנין	(ניעני ויענון)
שם המושלם			נתובח העייהי	
נתוכח הונק		נויצ	חיצי יות חריה	
נוספר נרכן		נסקט	שוו צריכי	,נגו.
איחו		קנדו'ה	כתבה	גריי
צריקה	חשבה	רנגנית	עגמית	ביתיו עויענני

סרוט מחרר

כמח

מחרי

סחרו

ראה חסברים מאחר

	אר	שקלים	סונ שרות	סנאני	יואהי

חשבום לחשלום

₪

לכלום כמרכום

וסל נאחי הכשולם

כלקי חמכקום

הואגר נוכח

כל כבקום וחנשובי וקשעני

כתא בסקמים וחעשע המעכי

תכטון יעיי אלי-שמ.

לכות יוברים של אס

Fig.2.

FORM PRINTER — 20

PORTABLE PRINTER — 22

CUSTOMER — 32

MANUAL DATA INPUT MEANS — 26

PORTABLE COMPUTER — 24

BANK — 34

FORM READER — 36

MAIN COMPUTER — 30

Fig.3a.

PREPARATION AND PRINTING OF COMPUTERIZED REPORTS/ACCOUNTS

①

METER READING ACTIVITY

END OF READING ACTIVITY

NO

YES

PRINTER BRINGS TOP OF DOCUMENT TO CORRECT POSITION ②

BAR-CODE IS READ OR NUMBER APPEARING ON PAGE IS PRINTED

IN THE PRINTER

IS THE DOCUMENT NUMBER NNNN ?

NO

YES

BILL IS PRINTED

PRINTING TERMINATES O.K.?

YES ①

NO

②
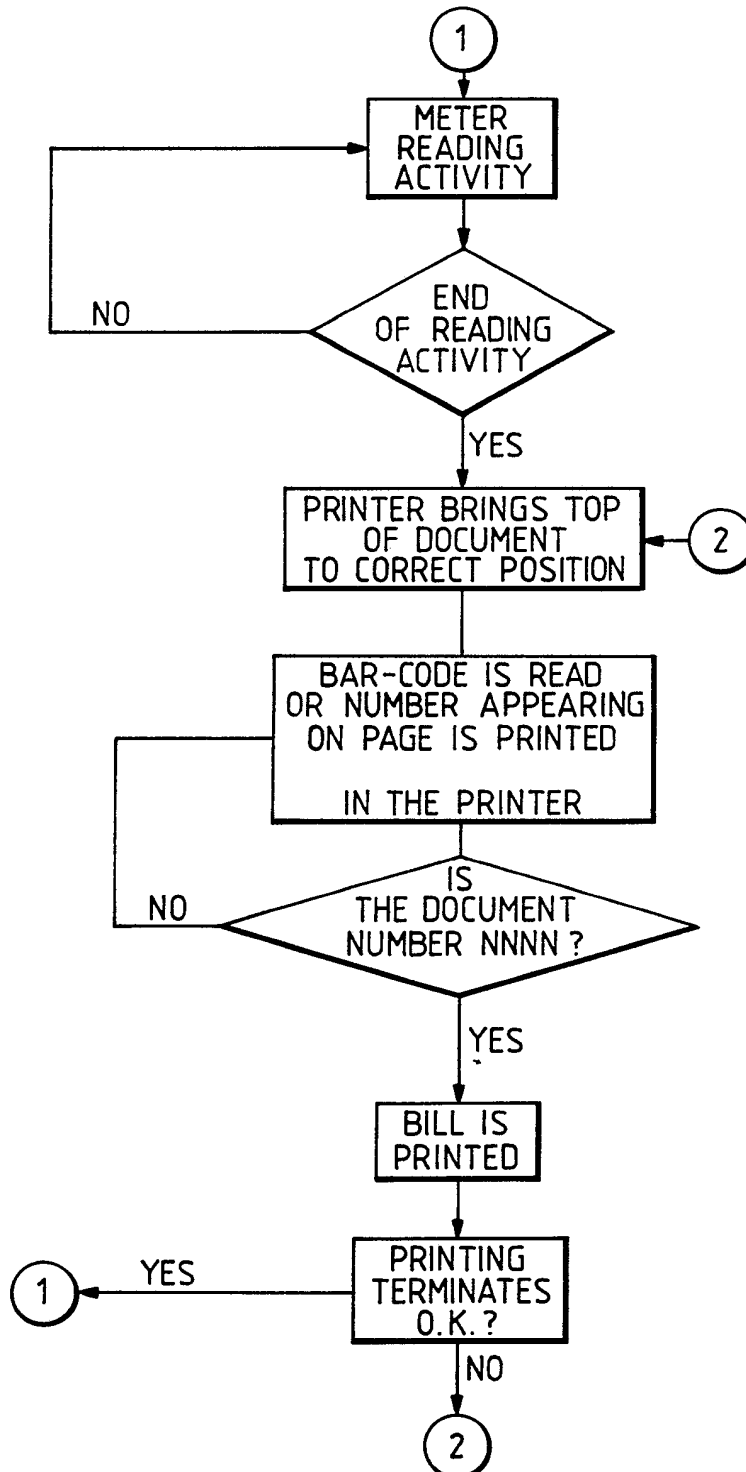
Fig.3b.

**PREPARATION AND PRINTING OF COMPUTERIZED DOCUMENTS
(REPORTS/BILLS) (WITH BAR-CODE OR MAGNETIC CODE)**

ACTIVITY OF METER READER	KEY	SCREEN MESSAGE	PRINTER OR TERMINAL ACTIVITY
1. END OF DATA ENTRY	END	"END OF READING ACTIVITY?"	
2. IF YES, GO TO STAGE 4 (ENTER)	"+"		BRINGS BILL TO TOP OF PRINTER AND SHOWS BAR-CODE (FOR BILL IDENTIFICATION)
3. IF NO	"—"	RETURNS TO INPUT/UPDATE DATA STAGE	
4. PORTABLE TERMINAL SHOWS		"BILL NO.? ----------"	
5. FROM BAR-CODE READS BILL NUMBER OR ANY OTHER REQUIRED IDENTIFICATION		"IDENTIFICATION NO. 1234567"	CONFIRMS DATA, COMPARING REQUIRED FIELDS ON THE DOCUMENT (REPORT/BILL)
6. CONFIRMATION	+	CONFIRMS DATA BY COMPARISON FACTORS AND REMEMBERS DATA FOR FUTURE ACTIVITY	PRINTS DATA WHICH WAS READ ON BILL
*IF A PRINTING HITCH OCCURS SCREEN SHOWS		"PRINT STOP-ERROR	NO PRINTING
*RETURN TO STAGE 1			
*APPARATUS CANCELS FROM DIRECTORY BILL FOR WHICH PRINTING DID NOT TERMINATE SUCCESSFULLY		APPARATUS REMEMBERS AND REPORTS ON BILLS/REPORTS WHICH WERE CANCELLED FOR ANY REASON	
7. AT END OF PRINTING		"END OF PRINTING"	BRINGS NEXT BILL TO TOP OF PRINTER

*RETURN TO STAGE 1

REPORTS HAVING IDENTIFICATION DATA AND PRINTING THEREOF

FIELD OF THE INVENTION

The present invention relates to apparatus and procedure for collecting utility data and similar data and preparing a bill therefor on the spot and, in particular, to apparatus and procedure for printing such bills, or any other documents, wherein identification printed thereon can be read by two different reading means.

BACKGROUND OF THE INVENTION

Collecting data, especially utility data, according to conventional methods is a time consuming and costly process. First, a meter reader must go from house to house reading the meters and noting the current readings. This data is then returned to a central processing station where bills are printed according to this data. The bills must then be deposited at the appropriate houses, either manually or via the mails.

This process not only is costly due to the two stage delivery system, but the utility company receives payment a significant amount of time after the actual meter reading.

One solution to this problem is shown in U.S. Patent 4,122,034 to Etter. Etter discloses a portable computer and computer operated printer which the meter reader carries on his rounds. Customer profile information is input into the computer in advance. The meter reader merely identifies the meter being read (i.e., the customer who is being billed at the time) and gives the current meter reading and a bill is printed on the spot by the computer.

This method cannot be used in this fashion in Israel because the printer can only print utilizing ordinary ink.

Thus, the bank, which identifies each customer via a number imprinted on the bill in magnetic ink or optical characters, cannot determine which bill belongs to which customer and, therefore, cannot credit the correct account.

On the other hand, bill forms with these magnetic identification symbols preprinted thereon cannot be utilized because the hand held computer cannot read them and, therefore, cannot identify the particular customer with the particular bill. In fact, forms which can be read and identified by two different devices cannot be printed by any conventional portable printer.

Accordingly, today the device of Etter can be utilized only to collect the relevant data which is the brought to a central processing station where bills are printed via special and expensive printers on paper having the necessary magnetic or optical consumer identification. Thus, the goal of obviating the necessity for multiple stages is not met.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a method and apparatus for printing bills on location, whether utility bills, parking tickets or any other documents, which contain identification means readable by a plurality of different reading means.

There is thus provided in accordance with the present invention a method of printing reports _in situ_ comprising the steps of:

providing to the printer of a hand carried computer a first blank form having printed thereon a first identification symbol in a first manner readable by said

hand carried computer and a second identification symbol, corresponding to the first symbol, in a second manner readable by a second device;

inputting to the hand carried computer the identification code printed on said first blank form;

inputting to the hand carried computer consumer identification information corresponding to a first consumer;

causing said consumer identification information to be associated with the first and second symbols on said first form;

inputting to the hand carried computer current data for said first consumer

processing said current data for printing on the form;

actuating the printer associated with the hand carried computer to print said data on said first form;

providing to the printer a second blank form having printed thereon a first identification symbol in a first manner readable by said hand carried computer and a second identification symbol, corresponding to the first symbol, in a second manner readable by a second device;

inputting to the hand carried computer the identification code printed on said second blank form;

inputting to the hand carried computer consumer identification information corresponding to a second consumer;

causing said consumer identification information to be associated with the first and second symbols on said second form;

inputting to the hand carried computer current data for said second consumer

processing said current data for printing on the form;

actuating the printer associated with the hand carried computer to print said data on said second form;

repeating said steps of providing through actuating until all the data for all consumers have been printed;

causing said second device to read the second identification symbol on each of said printed forms; and

actuating the second device to correlate the identification symbol with the associated consumer.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be further understood and appreciated from the following detailed description taken in conjunction with the drawings in which:

Fig. 1a is a plan view of a form constructed and operative in accordance with one embodiment of the present invention;

Fig. 1b is a plan view of a form constructed and operative in accordance with an alternate embodiment of the present invention;

Fig. 2 is a schematic illustration of one embodiment of the present invention; and

Figs. 3a and 3b are flow charts illustrating the operation of one device according to the method of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to a form which is identifiable by two independent devices and to a method for printing reports identifying the corresponding customer or individual on one device and reading the reports on a second device which independently identifies the customer. Forms which are readable by two incompatible devices are not printable in the field using conventional printers.

While the present invention has a wide variety of applications, it will be described hereinbelow, by way of example, with regard to collection and billing of utility customers, for which it is particularly suited. However, it will be appreciated that the invention is not limited to this application, but rather can be utilized in any application where it is desired to input data in one medium from a form which is to be read by a device reading another medium. This includes all bills which are prepared in the field, including, for example, parking violation tickets, as well as other types of documents.

With reference to Figs. 1a and 1b there are shown two forms printed and operative in accordance with the present invention, each including a blank 10. In the illustrated embodiments, the forms represent utility bills, and blanks 10 are of the dimensions required by the utility company. Blank 10 includes a payable portion 12 and a receipt portion 14. Upon payment of the bill, both portions 12 and 14 are stamped by the bank where payment is made, the payable portion being returned to the utility company and the receipt portion remaining with the consumer as proof of payment.

As in conventional forms, fields are left vacant for typing of the customer name and address, meter reading, other relevant data and amount to be paid. In addition, a first identification symbol 16, here illustrated as a bar code, is printed on the blank 10 on the receipt portion 14, and may also be printed on the payable portion 12. A second identification symbol 18, here illustrated as a string of numerals printed in magnetic ink, is printed on the blank 10 on the payable portion 12. First and second identification symbols 16 and 18 may have the same meaning, each being readable by a different device. Alternatively, they may have independent values which are each correlated by their own reading device to the same third value, i.e., a customer identity number.

At the time of printing the bill, as will be described in further detail hereinbelow, the bar code is entered into the printing device which is operative to associate the particular coded symbol with the particular consumer being billed at the time.

Upon receipt of the payable portion 12, the utility company passes the portion of the blank through its device which reads magnetic ink and identifies the particular consumer to whom the bill belongs.

Operation of the present invention is as follows, with reference to Fig. 2. A plurality of blank forms similar to those in Fig. 1a or 1b are imprinted by a form printer 20 with two different identification symbols, i.e., bar code and/or magnetic characters and/or optical characters, or any other identification means readable by man or machine.

The printed forms are loaded into a portable printer 22 which is coupled to a portable teletransaction computer 24. The forms may be provided in a roll with perforations between adjacent forms to permit separation thereof, or folded accordian style, or in any other fashion permitting printing on one form at a time followed by translation of the forms to advance the following form into the printer.

Portable computer 24 and portable printer 22 are carried by the meter reader or other user on his rounds in the field. Computer 24 is provided with manual data input means 26 for inputting data. Input means 26 may include a keyboard, a series of push buttons, a bar code reader, or other means suitable for use in the field.

A main computer 30 stores all the data regarding customer identification, including address, meter number, previous bills, previous payments, and so on. The customer identification data necessary to the meter reader is provided from the main computer 30 to the portable computer 24, in any conventional manner. The meter reader takes the computer 24 and printer 22 and proceeds on his rounds.

At the meter of the first consumer 32, the meter reader reads into the portable computer the first identification symbol on the form which is present in the portable printer at the time. This may be by means of passing a bar code reader over a printed bar code on the form, by typing the visable numbers, or by any other method, depending upon the type of identification symbol. He then calls up the customer identification data for that consumer.

The meter reader now inputs the present meter reading. and again reads in the first identification symbol to indicate that entry of the data has been completed. The portable computer 24 generates the proper bill and instructs the printer 22 to print out the bill on the already identified form. At the same time, the computer correlates that number bill with the previously identified consumer 32, storing that information in its memory. As the bill is printed out, the following form advances into the printer, ready for printing. The bill is deposited with the consumer 32 and the meter reader proceeds to the next consumer. In the event that there is no second reading, the form is not printed out but is cancelled.

Consumer 32 takes his bill to the bank 34 to pay. Upon payment, one portion of the bill is sent by the bank to the utility company, together with indication of payment thereof. The second identification symbol on this portion of the bill is read by a bill reader 36 which identifies the particular form number which was paid.

In the meantime, the information from the portable computer 24 relating the first identification symbol to customer 32 has been transferred to main computer 30. Computer 30 is now able to correlate the bill form which was paid with customer 32 who paid it, and can credit his account.

This identification process can be repeated each time the meter reader reaches a new customer. Alternatively, the forms may be identified by sequential numbers. In this case, portable computer 24 can be programmed to add one figure each time a new bill is printed out. Alternatively, all the

bills or reports can be printed out at one time at the end of the recording action. Means for periodic verification that the number of the form is, indeed, the expected number should also be provided.

It will be appreciated by those skilled in the art that while the shape and size of the bill are dictated by the utility company or by the banks (i.e., that which is readable by their existing devices), the printing thereon depends on the programming of the portable printer. The forms may be printed in the conventional manner, i.e., parallel to the direction of movement of the forms. They may be printed perpendicular to the direction of advancement of the forms in the printer, as shown in Fig. 1a. Or, they may be printed in both manners, as shown in Fig. 1b.

Referring now to Figs. 3a and 3b, there is shown a flow chart of the software for directing the operation of the computer of the present invention.

It will be appreciated by those skilled in the art that the invention is not limited to what has been described hereinabove by way of example. Rather, the scope of the invention is limited solely by the claims which follow.

CLAIMS

1.   A method of printing reports _in situ_ comprising the steps of:

providing to the printer of a hand carried computer a first blank form having printed thereon a first identification symbol in a first manner readable by said hand carried computer and a second identification symbol, corresponding to the first symbol, in a second manner readable by a second device;

inputting to the hand carried computer the identification code printed on said first blank form;

inputting to the hand carried computer consumer identification information corresponding to a first consumer;

causing said consumer identification information to be associated with the first and second symbols on said first form;

inputting to the hand carried computer current data for said first consumer

processing said current data for printing on the form;

actuating the printer associated with the hand carried computer to print said data on said first form;

providing to the printer a second blank form having printed thereon a first identification symbol in a first manner readable by said hand carried computer and a second identification symbol, corresponding to the first symbol, in a second manner readable by a second device;

inputting to the hand carried computer the identification code printed on said second blank form;

inputting to the hand carried computer consumer identification information corresponding to a second consumer;.

causing said consumer identification information to be associated with the first and second symbols on said second form;

inputting to the hand carried computer current data for said second consumer

processing said. current data for printing on the form;

actuating the printer associated with the hand carried computer to print said data on said second form;

repeating said steps of providing through actuating until all the data for all consumers have been printed;

causing said second device to read the second identification symbol on each of said printed forms; and

actuating the second device to correlate the identification symbol with the associated consumer.

2. A method according to claim 1 and wherein said first manner is selected from the group consisting of printing in magnetic ink or optical characters or a bar code.

3. A method according to claim 1 and wherein said second manner is selected from the group consisting of printing in magnetic ink or optical characters or a bar code.

4.   A method according to claim 2 and wherein said second manner is selected from the group consisting of printing in magnetic ink or optical characters or a bar code.

5.   A method according to claim 1 and wherein said first manner comprises a bar code and said second manner comprises printing in magnetic ink.

6.   A method according to claim 1 and wherein the step of actuating the hand carried computer comprises causing the form to move lengthwise through the printer while printing thereon, at least partially, in a direction perpendicular to the movement.

7.   A form comprising a first identification symbol arranged to be readable by a first device and correlated by the first device with a particular individual, and comprising a second identification symbol corresponding to the first identification symbol and arranged to be readable by a second device and correlated by the second device with the same individual, wherein the first identification symbol cannot be read by the second device and the second identification symbol cannot be read by the first device.

8.   A form according to claim 7 and wherein the first device comprises a hand held portable computer and the second device comprises a device for reading magnetic ink or optical characters or bar code.

9.   A method substantially as shown and described
hereinabove or as illustrated in any of the drawings.